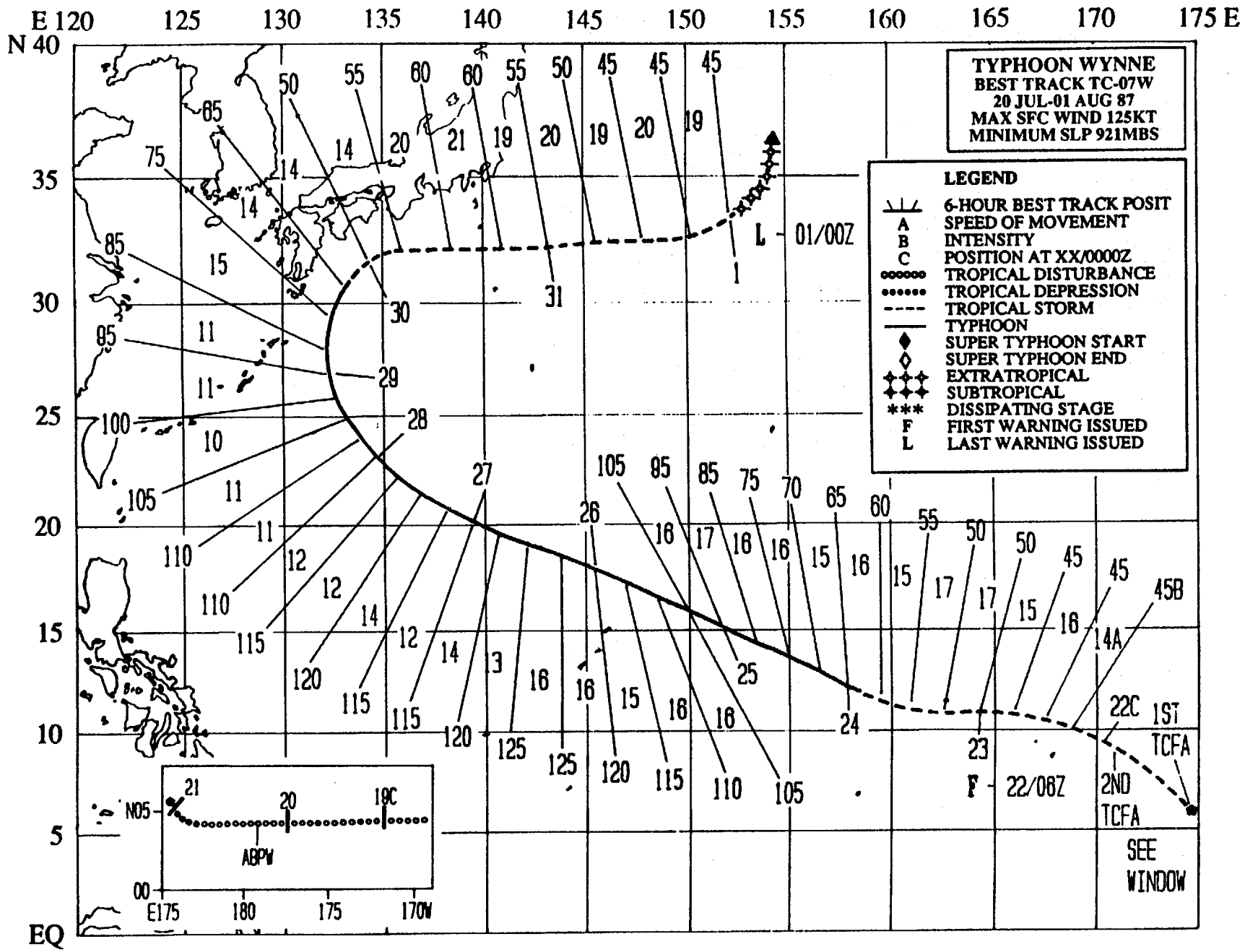

TYPHOON WYNNE
BEST TRACK TC-07W
20 JUL-01 AUG 87
MAX SFC WIND 125KT
MINIMUM SLP 921MBS
LEGEND
6-HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
SUBTROPICAL
*** DISSIPATING STAGE
F FIRST WARNING ISSUED
L LAST WARNING ISSUED
L - 01/00Z
F - 22/06Z
22C 1ST TCFA
2ND TCFA
SEE WINDOW
E 120 125 130 135 140 145 150 155 160 165 170 175 E
N 40 35 30 25 20 15 10 5 EQ
NOS
ABPW
E175 180 175 170W

TYPHOON WYNNE (07W)

Typhoon Wynne was the fifth typhoon in the western North Pacific in 1987 and was of interest due to several factors. Early communication with meteorologists from Kwajalein Atoll (WMO 91366) proved instrumental in relocating Wynne, using radar fixes during its formative stages. The system developed into the third "midget" typhoon of the year and maintained a visible eye for six days. Wynne tracked along a constant 294 degree bearing for four consecutive days, during which time, it crossed the northern Mariana Islands, causing extensive damage to the islands of Alamagan and Agrihan.

Wynne appeared as an amorphous, but persistent, mass of cloud in the maximum cloud zone east of the dateline and was first mentioned on the 200600Z July Significant Tropical Weather Advisory (ABPW PGTW). Analysis of the sparse synoptic data indicated convergence enhancing cross-equatorial low-level flow into the system in the horizontal with moderate wind shear in the vertical.

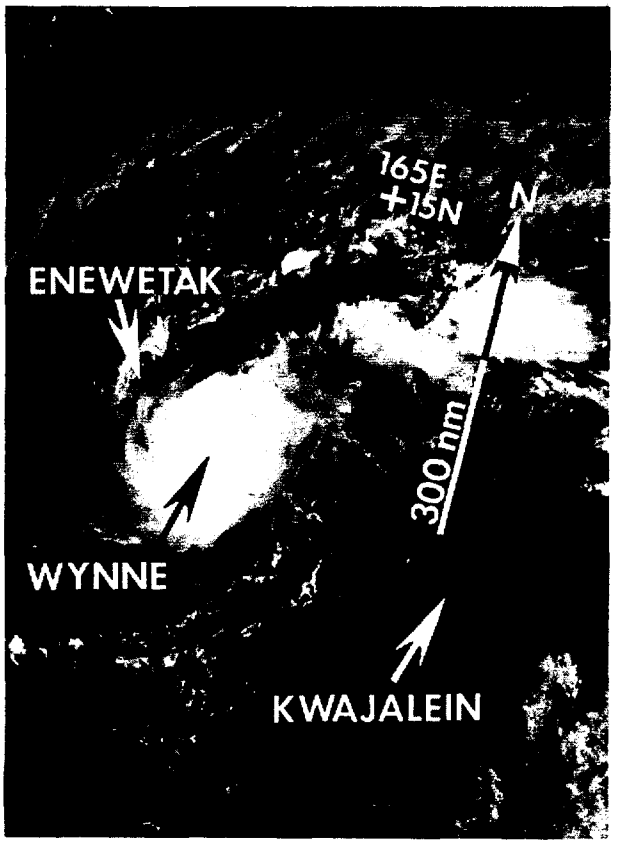


Figure 3-07-1. Wynne at the tropical storm stage of development about 200 nm (370 km) west-northwest of the Kwajalein Atoll. Note the relatively cloud-free ring surrounding the small bright CDO (222300Z July DMSP visual imagery).

Wynne moved westward and continued to improve in convective organization. Satellite intensity analysis (Dvorak, 1984) of the well-defined spiral cloud bands at 210000Z estimated 30 kt (15 m/sec) surface winds and 45 kt (23 m/sec) surface winds were forecast for the next day. Based on this information, a Tropical Cyclone Formation Alert (TCFA) followed at 210430Z. Through the 20th, Wynne's track remained westward in response to the synoptic-scale flow south of the subtropical ridge axis. On 21 July, however, satellite reconnaissance fix positions indicated cloud system center movement towards the northwest. Due to this track change the alert area was redefined at 212030Z and the TCFA was reissued.

Discussions on 22 July between the Typhoon Duty Officer (TDO) and meteorologists on the Kwajalein Atoll, Marshall Islands, provided invaluable positioning information. Kwajalein was receiving light winds and radar showed the main convection associated with the tropical cyclone to be well to the north of their location. The result was a 120 nm (222 km) northward relocation of the 221200Z warning position from its expected location. By the end of the day, Wynne had separated from the maximum cloud zone and drawn down into a small bright central dense overcast (CDO) (Figure 3-07-1).

An eye first became visible on satellite data at 240000Z. From that point onward (a period of six days), the system was characterized by a small eye. The eye diameter changed slightly from 12 nm (22 km) to 18 to 22 nm (33 to 41 km) in diameter. Typical of a smaller than normal system, it had smaller than average 30 kt (15 m/sec) wind radii. Aircraft reconnaissance revealed this anamoly.

Figure 3-07-2. Plot of aircraft reconnaissance data from 252134Z to 260125Z July, showing the surface and 700 mb flight-level wind distribution around Typhoon Wynne. Note the greater extent of the wind radii in the northeastern semicircle.

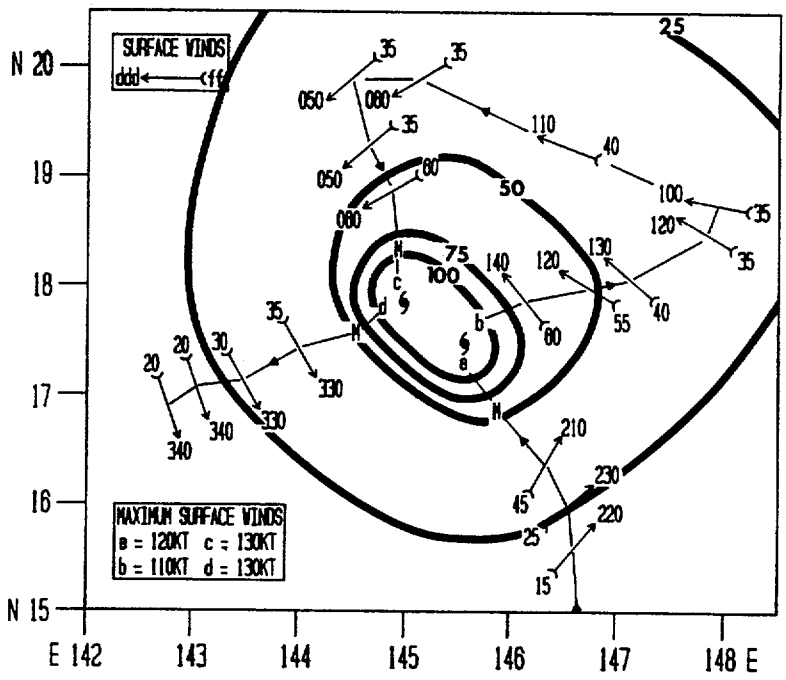
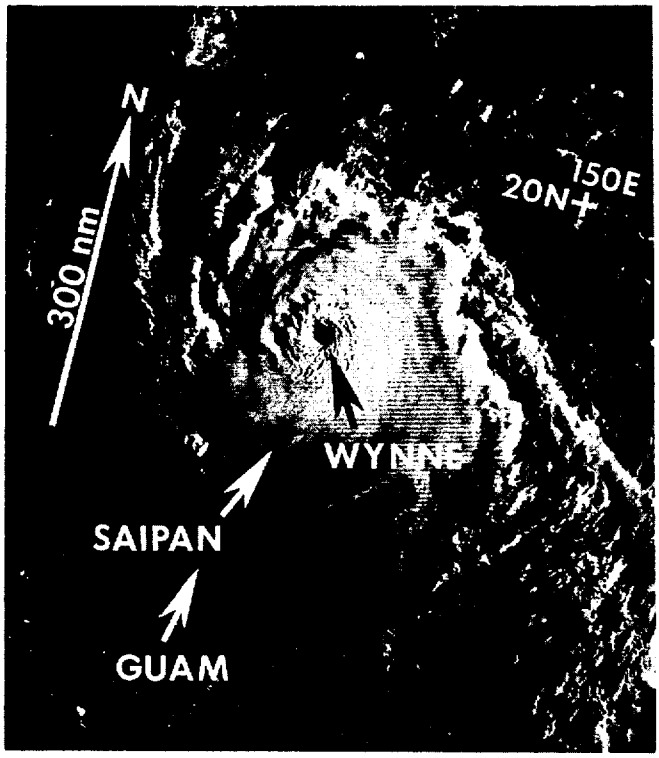


Figure 3-07-3. Typhoon Wynne two hours before crossing the northern Marianas and near its closest point of approach to Guam. With the low morning sun off the right side of the picture, differences in cloud top heights are accentuated by shadowing. In this image an apparent "stadium" effect can be seen; the larger upper-level inner eye wall boundary slopes downward to the concentric smaller low-level eye (252015Z July DMSP visual imagery).



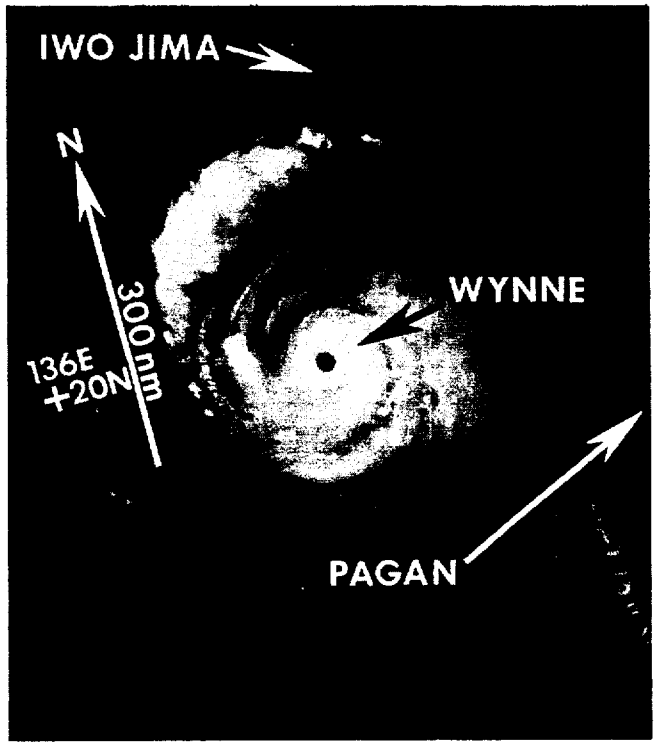


Figure 3-07-4. Midget Typhoon Wynne near maximum intensity. Note the well-defined 15 nm (28 km) eye (261815Z July NOAA infrared imagery).

Wynne's wind radii were nearly twice as large in the northeast semicircle as elsewhere (Figure 3-07-2). This appears to be related to the pressure gradient between Wynne and the subtropical anticyclone to the north. Figure 3-07-3 shows Typhoon Wynne two hours before it passed directly over the northern Marianas island of Alamagan (240 nm (444 km) north-northeast of Guam). At approximately the same time (240000Z through 271200Z) Wynne followed an almost straight track along a mean 294 degree bearing. While on this course and mean speed of 16 kt (30 km/hr), the typhoon attained its maximum intensity of 125 kt (64 m/sec) on the 26th (Figure 3-07-4).

An interesting aspect of Wynne's travel across the western North Pacific was that it maintained a brisk forward speed of movement, even through recurvature, where it slowed only slightly to 10 kt (19 km/hr). Typically, a larger decrease in forward speed is expected as a system passes through the area of weaker steering flow at the break in the subtropical ridge axis.

As Wynne rounded the western end of the mid-level subtropical ridge, it began to experience increasing vertical shear from the north. The exposed low-level cyclonic circulation became visible at 291500Z (Figure 3-07-5). Even with this unfavorable environment in the vertical, there were strong winds associated with the system for the next two days. Aircraft reconnaissance at 291111Z found 700 mb winds of 76 kt (39 m/sec).

Wynne was downgraded from typhoon to tropical storm intensity on the 32nd warning (valid at 300000Z) after a satellite intensity estimate of 50 kt (26 m/sec) was attained. Subsequent aircraft reconnaissance at 292157Z and 300027Z also reported maximum 700 mb flight-level winds of 60 kt (31 m/sec).

Wynne continued slowly weakening as it moved eastward, south and southeast of the main Japanese island of Honshu. Its forward speed increased as a result of stronger mid-level westerly flow. At the same time, Wynne began entraining cooler, drier air from the north. As a consequence, extratropical transition was complete at 010000Z August.

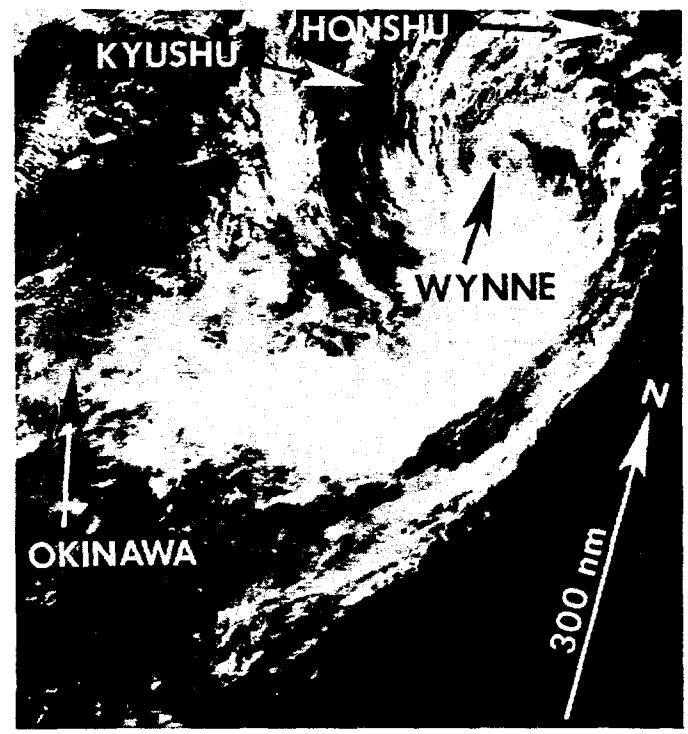


Figure 3-07-5. Wynne, at tropical storm intensity 130 nm (241 km) east of the Japanese island of Kyushu. Low-level cloudiness defines the exposed circulation center. Of interest, the bright and dark patches on the ocean's surface to the east of the system are the result of sun-glint. These patches indicate the areas of relatively smooth ocean surface with less wind waves which are usually the result of lighter surface winds near the axis of the lower-tropospheric subtropical ridge. In this case the ridge axis runs east-to-west near 22 degrees North Latitude. Understanding the location and atmospheric processes associated with this ridge are vitally important to tropical cyclone forecasting (292359Z July DMSP visual imagery).

In retrospect, the islands of Alamagan and Agrihan suffered the only recorded major damage due to Wynne's passage. Their crops were 90 to 100 percent destroyed and all coconut trees were downed. Fortunately no lives were lost. Except for this head-on meeting between Wynne and these islands, no synoptic data revealed the potent punch of this midget typhoon. Only direct aircraft measurement and indirect satellite reconnaissance recorded the wind intensities because of the system's small size.